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ABSTRACT

Structured Team Problem Solving (STePS) is a problem solving model for shared decision making. This project uses the model to discover if children can learn using this method, and what adaptations would be necessary for child use. Sixth grade students in their social studies class worked together in teams (6-8) to identify what they already think they know about a social studies topic. They then identify what they need to know, how they will approach this new learning, and how they will present their findings to other classmates. Students learn the six STePS procedures of brainstorming, clarifying, clustering, prioritizing, diagramming, and action planning. They learn and use the fifteen STePS techniques that include role sharing among facilitator, recorder, and checker. Students were observed using this model over a three year period. Findings from the project include the following: (1) students learn as much about a content area when they are learning via STePS as they do in a conventional teacher dominated classroom; (2) sixth grade students can assume responsibility for their own learning in social studies and when they are allowed to do they express more interest in the subject; and (3) this model can be used by sixth graders with few or no changes to the model. However, the training process used with adults needs modification to meet the needs of younger children and to match the structure of the school day. (KM)

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Adapting STePS, an Adult Team Problem Solving Model, for use with Sixth Grade Students

Presented March 5, 1992
at the Annual Conference of
The Eastern Educational Research Association
in Hilton Head, South Carolina

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AUTHORS

The paper is written jointly by two professor-consultants. One is chair of the Educational Administration Department at SUNY Oswego; the other is Emeritus at SUNY Brockport and senior associate in their consulting firm, STePS Associates, Inc. Sheive and Metivier have developed a team problem solving model for use by adult educators. Denise Clark is a sixth grade teacher at Valley Elementary School in the Marcus Whitman School District, Rushville, NY. Clark has tested and adapted the adult model with children in her classroom for the past three years.

MAJOR FOCUS

The focus of the project was to discover

(1) whether the STePS (Structured Team Problem Solving) model is useful as a teaching and learning tool for sixth grade students who are learning social studies, and

(2) the adaptations that need to be made in converting an adult model for child use.

PERSPECTIVE

Recent articles decry the lack of early training in team problem solving which is essential in the workplace: "The work force is changing, but so far the public schools haven't done much to keep up." (Harrington-Lueker, 1991: 34) "Very few of us will work totally by ourselves." (SCANS Report, 1991:xviii) "The growth of cooperation within firms is signaled by increasing team-oriented work process." (Carnevale, 1991:63)

For the past ten years great emphasis has been placed upon the involvement of administrators and teachers in shared decision making. Sheive and Metivier developed a problem solving model for shared decision making that is presently being used in over a hundred New York State school districts. The copyrighted model is called STePS, an acronym for Structured Team Problem Solving. STePS developed over time from an emphasis on educational quality circles to the development of specific behaviors which allow consensual decision making. (See Appendix A.) Three days of basic training in STePS provides a team with the skills necessary to identify, analyze and solve problems related to the work environment. Three days of advanced training in STePS provides a potential trainer with the skills necessary to lead a team through basic training. Sheive and Metivier have published two training documents: A Participant's Guide to STePS and A Trainer's Guide to STePS.

For the past three years Sheive and Metivier have collaborated with Clark, a sixth grade teacher who has expertise in cooperative learning. She learned STePS in a graduate class and believed that the skills taught via STePS training might also be learned by her students.

TECHNIQUES

Clark developed lessons for her students as they study social studies. Students work in teams (6-8) to identify what they already think they know about the content to be covered, what they need to know, how they will approach their new learning, and how they will present their learnings to other class teams.

Clark teaches students the six STePS procedures of brainstreaming, clarifying, clustering, prioritizing, diagramming and action planning. They learn and use the fifteen STePS techniques which include role sharing among facilitator, recorder and checker.

First, Clark models these procedures and techniques with students and asks them to practice them as they work on their social studies assignment. Then she observes the children in teams and moves in to provide corrective feedback only when necessary. The teams work on social studies using STePS from 30-40 minutes a day for an average of three weeks out of four weeks during the entire school year.

Clark has followed this pattern for three years. This year, beginning in January, she used instructional print material designed to reinforce and extend student learning. She provided students with copies of pages reprinted from A Participant's Guide to STePS and asked students to review their learning of STePS using this print material. She developed a "STePS Vocabulary List" worksheet, a "STePS Feedback Diary." and a "STePS Learning Diary" where students record and reflect on feedback they receive from peers and the teacher. On the "StePS Team Log" students record the accomplishments of a team on a unit. (See Appendices B, C, D and E.)

Upon the completion of each unit of work, students are regrouped by using a sociogram. By the end of the school year every student has worked with every other student in the class as a member of a problem solving team.

DATA SOURCES

Throughout this process Clark wrote her observations, videotaped teams at work, and involved students in deciding how to rework STePS for children in the elementary school. Clark also contrasted scores on the New York State Program Evaluation test in social studies for classes who studied social studies without and with training in STePS.

Metivier made periodic visits to the classroom to observe students at work and to interview the students about their learning. Sheive, Metivier and Clark met throughout the project to assess the degree to which the model assists students to learn social studies and to identify the changes that need to be made in adapting the model for use by children.

RESULTS AND CONCLUSIONS

Results are presented in this section by responding to the research questions:

(1) Do students learn social studies as well using the team problem solving approach as they did when this content area was presented by the teacher and prescribed by the textbook?

(2) Is the STePS (Structured Team Problem Solving) model useful as a learning tool for sixth grade students who are learning to work on teams?

(3) Is the STePS (Structured Team Problem Solving) model useful as a teaching tool for a sixth grade teacher?

(4) What adaptations need to be made to convert an adult model for child use?

(5) What adaptations need to be made to convert materials for adult trainers into materials for teachers of children?

Findings on RQ (1) **Do students learn social studies as well using the team problem solving approach as they did when this content area was presented by the teacher and prescribed by the textbook?**

In order to identify how well Clark's students learned social studies, we compared the average report card grade for each quarter over three years and the final grade for three years. The data in Figure 1.1 provide this data for three separate years: 1987-88, when Clark and her students did not use STePS; 1989-90 and 1990 -91, two years when Clark and her students did use STePS.

Figure 1.1: Mean Report Card Grades in Social Studies

Quarter	1987-88	1989-90	1990-91
1	75.0	84.2	75.8
2	69.3	80.4	81.0
3	72.5	82.0	79.8
4	78.5	82.8	84.7
Final	73.8	82.3	80.3

Data in Figure 1.1 indicate that students averages were better in the 1989-90 school year, the first year that Clark used STePS with her students, than they were in 1987-88, a year when she did not use STePS. However, the final average for the second year of the project was lower than the first year of the project.

Additional data on social studies learning was available and is reported in Figure 1.2. Here are mean scores on unit quizzes in the social studies textbook. Students were not quizzed at the end of each unit using this measure, so some data are missing.

Clark doubts the validity of these scores, since, in her assessment, the authors go out of their way to rephrase the question so that the students do not recognize the material. Clark believes the unit tests are as much a test of reading as they are a measure of social studies learning. However, since these data were available, they are reported.

Figure 1.2: Mean Scores on Social Studies Unit Tests

Unit	1987-88	1989-90	1990-91
1	78.56	95.07	66.9
2			
3	78.70	69.16	79.18
4	58.72	53.04	71.16
5	72.41	64.33	65.66
6	82.58	84.83	89.20
7	81.20	88.58	81.39
8	76.83	74.60	73.33
9	70.83	80.13	69.90
10	58.12	67.88	76.45
11	56.83		77.83
12			
13			
14	66.40		75.52
Average	71	75.3	75.3

In striving to understand why students in the second year of the project did less well than those of the first year on their report card grades in social studies, Clark recalled that her 1990-91 class had an unusually high number of students with special learning needs. She knew that all students with special learning needs at the Valley School are assigned to her classroom. As the data in Figure 1.3 indicate, during the 1990-91 school year seven students (as opposed to five) fell in this category. The class size was larger as well. It may be that the addition of two students with special learning needs to her classroom impacted the average social studies grade.

Figure 1.3: Breakdown of Students in Clark's Classes 1988-91

	Number of Resource Students	Number of Students with Reading Problems	Number of Regular Students	Total Students
1989-90	2	3	17	22
1990-91	4	3	18	25

Conclusions on RQ (1)

1.21 Students learn as much about the content area when they learn via STePS as they do in a conventional teacher-dominated classroom.

Findings on RQ (2) **Is the STePS (Structured Team Problem Solving) model useful as a learning tool for sixth grade students who are learning to work on teams?**

Two kinds of data corroborate the finding that STePS is a useful tool for students who are learning to work on teams. One data set is conclusions drawn by the teacher; the other is unanticipated student behaviors.

Clark makes the following observations:

2.11 STePS focuses the children on what they know and what they need to know in the content area. Over time, they:

2.111 realize they already have some knowledge, and that knowledge is useful;

2.112 ask more sophisticated questions in the content area (i.e., The Egyptians buried their dead by using mummification. How did the Greeks and the Romans bury their dead?); and

2.113 develop more ownership in their own learning.

2.12 Using STePS, no student(s) can dominate in small group sessions. Conversely no student(s) can fail to contribute. All students participate, and all contributions are valued. Thus, STePS training builds student self esteem.

2.13 In the STePS model, the facilitator and each team member are responsible for monitoring the process. The children monitor group process and make corrections when necessary.

2.14 Children of all ability and skill levels participate equally in the STePS model. Pupils with attention deficit disorders require no special attention to learn the model and/or to participate in team problem solving. They are not judged as deficient by their peers.

2.15 When children use STePS to learn social studies, every child has several opportunities to speak during a lesson. When the teacher leads the class, only one child responds at a time, so a child has far fewer opportunities to be heard.

2.16 Several unanticipated outcome demonstrate that children use the STePS process to solve problems that they identify, and they do so without direction from the teacher.

2.161 The 1989-90 cohort of sixth graders decided to plan their Hallowe'en party by using the STePS process. They assumed responsibility for refreshments, games and clean-up. The teachers were guests.

2.162 In the spring of 1990, Clark was injured and absent from school for more than a month. She informed the substitute teacher, who was not trained in STePS, that the students were studying social studies using STePS, and they should continue to do so. The substitute teacher was impressed by the students' ability to work independently and productively in teams.

2.163 The 1990-91 cohort of sixth graders used STePS to resolve an interpersonal issue that arose on the playground.

2.164 On another occasion the 1990-91 cohort also asked the teacher to absent herself from the classroom. Later the teacher discovered that the students planned a party for her by using the STePS process.

2.165 The 1991-92 cohort of students used the STePS process to decide what to do after a Christmas present was missing.

Conclusions on RQ (2)

2.21 Sixth grade children can assume responsibility for their own learning in social studies. They express more interest in the content area.

2.22 A team problem solving model such as STePS allows all students to contribute equally to the group. Children with special needs can learn and use the process as well as other students.

2.23 Working on a team using a team problem solving model such as STePS appears to increase their independence as learners and their self esteem.

2.24 When sixth grade children learn a team problem solving process such as STePS to learn a content area, they transfer their learning in order to solve other problems that arise for them.

Findings on RQ (3) **Is the STePS (Structured Team Problem Solving) model useful as a teaching tool for a sixth grade teacher?**

Clark provides the following background: "The teaching of social studies is moving away from the textbook approach. I tried to use historical fiction to allow students to connect to the content area, but I was unable to identify enough fiction to address the material appropriately. I decided to try STePS and to share with students the responsibility for their learning. STePS provides me with a solution to my problem of social studies teaching."

"Every elementary school teacher has areas of special expertise. Mine were mathematics and computers. Now I have a new area of expertise: team problem solving. Also, I have learned some new things about children's interest in social studies from their research."

"At first, I had difficulty letting the students do their own work. I wanted to tell them the answers. However, as I learned that they could handle the task of assuming responsibility for their own learning, I became more comfortable with this way of teaching."

Clark makes the following specific observations about STePS as a teaching tool:

3.11 I learn more quickly what is the students' collective grasp of the material.

3.12 I more easily identify when students have misconceptions.

3.13 I have more time to watch students at work and therefore have more information on each student's strengths and weaknesses.

3.14 Since student thinking is displayed on newsprint, I can see what each student contributes.

3.15 Students consult a greater variety of resources in their learning. They use encyclopedias, globes and maps, newspapers and magazines in the library. They use me as a consultant. They interview parents. They will soon have access to an electronic bulletin board, K12NET, which will allow them to ask questions of people all over world.

3.16 STePS has provided opportunities for student learning in other areas: vocabulary, writing, research, reading. (See Appendices B, C, D and E.)

3.17 Using STePS, I have more opportunities to work with children on higher level thinking skills. For example, when a team is producing work that falls short of my expectations, I ask them to evaluate their progress and to make mid course corrections. They are able to evaluate and adjust.

Conclusions on RQ (3)

3.21 When students record their work on newsprint as they do in STePS, the teacher can gather data on each individual child's work.

3.22 When students engage in team work such as they do using STePS, the teacher has more time to observe students' strengths and weaknesses.

3.23 When students assume responsibility for their own learning, the teacher accesses more information about the students' learning process.

3.24 When students engage in problem solving as they do in STePS, they naturally consult a wide variety of resources, increase their vocabularies, and are motivated to read and write as necessary.

Findings on RQ (4) What adaptations need to be made to convert an adult model for child use?

Clark, with the assistance of Metivier, designed lessons for children to learn STePS. Throughout the experiment, they compared and contrasted the training process used with adults to the model they devised for children. They note the following:

4.11 Basic training for adults in STePS occurs best in a three day session. Teaching children in STePS occurs best in a series of 30-40 minute daily lessons. Intensive, short term training works well for adult learners. The structure of the sixth grade (meeting all day every day for a year) requires that episodic, ongoing teaching and learning occurs.

4.12 Basic training for adults in STePS includes print materials during every phase of the training since some adults learn best by reading. Teaching children STePS works well with early modeling by the teacher followed by extensive hands-on experience. Children understand selections from A Participant's Guide to STePS if they have prior experience with STePS. Children use the text to refine and reflect on their experience.

4.14 Adults and children benefit from learning all six procedures and all fifteen techniques in the STePS process. However, there are some differences:

4.141 adults "debrief" at the end of each session, children "debrief" weekly;

4.142 "broadcasting" is an important technique for adults since they are dealing with issues related to shared decision making and what is shared outside the team may impact how the team is perceived by others, in the sixth grade classroom "broadcasting" is used periodically as needed;

4.143 children do not want other teams to see their work, adults do not mind when other teams in training see their newsprint;

4.144 "feedback" to adults can be shared and dismissed, "feedback" to children should be acted upon (they need additional activities to reflect and write).

4.15 Adults can assume the roles of facilitator and recorder after the trainer explains the role and they read about it in A Participant's Guide to STePS. Children can understand and assume these roles after the teacher models facilitator and recorder behaviors.

4.16 When training adults in an intensive three day session, each team works with a trainer in a separate room. In the sixth grade classroom there is one teacher and four teams. Providing adequate wall space (to post newsprint) for four teams in a classroom is a challenge.

4.17 When training adults in STePS Basic Training, the first half day (of three days) is spent in activities and discussions which lead to common understandings on teams, conflict, quality, and consensus. When teaching children, these activities are unnecessary. Common understandings are developed during debriefing sessions.

4.18 When training adults, the trainer needs little expertise in the problem area. When teaching children, the teacher becomes a consultant to the students both in the content area and in STePS. She should be knowledgeable in the content area.

Conclusions on RQ (4)

4.21 A problem solving model such as STePS can be used by sixth graders with few or no changes in the model.

4.22 The trainer of adults and the teacher of children are commensurate roles: each is a consultant on the problem solving process.

4.23 The trainer need not have expertise on the problem area. The teacher must be a consultant to children on the problem area.

4.24 The training process used with adults needs modification to meet the needs of younger learners and to match the structure of the school day.

Findings on RQ (5) **What adaptations need to be made to convert materials for adult trainers into materials for teachers of children?**

Clark experienced STePS basic training and recommends that teachers undergo this training before they teach STePS to children. She has not received advanced training to become a STePS trainer, but feels that she was able to make the transition with assistance from Sheive and Metivier as needed. She is familiar with A Trainer's Guide to STePS and believes it can be adapted as A Teacher's Guide to STePS. She recommends that the following changes be made in that manual to adapt it for teachers who are instructing children in STePS:

5.11 Add sections which discuss how to model the roles of facilitator and recorder.

5.12 Add sections which discuss how to arrange the classroom for STePS.

5.14 Since STePS is taught over a long time period of time in the elementary classroom, several activities need to be developed for the teaching of each concept. (A Trainer's Guide to STePS only offers one activity per concept.)

5.15 Since students need reinforcement of their learning, develop worksheets for children such as those in Appendices B, C and D.

5.16 Consider publishing a folder with attached 5x8 cards on which teacher can record anecdotal records on student performance. (Clark uses a hand made version and finds it useful for documenting behavior. She uses the records when developing report cards or meeting with parents.)

5.17 Consider publishing A Student's Guide to STePS which includes art work appealing to youngsters and appropriate worksheets (See appendices).

5.18 Consider developing materials for organizing student work such as a box in which student logs, flow pens and masking tape can be stored.

5.19 Consider inventing a roll up screen on which several sheets of newsprint can be taped to facilitate the work of several teams in one classroom.

Conclusions on RQ (5)

5.21 The trainers of adults and the teachers of children need similar basic training experiences in a model such as STePS, but their advanced training should be different to match the differences in their learners.

5.22 Learning aids need to be developed for use by children.

5.23 Trainer materials need to be revised for use by teachers.

SIGNIFICANCE AND IMPLICATIONS

A significant finding of the project was the discovery that the STePS model does not need to be revised for use by children. (4.21) We underestimated the ability of children to use so-called adult behaviors and strategies to solve problems. We found that, for children to use the model, we needed to refocus the teacher, not the model. The implication of this finding is that a major effort needs to be expended on staff development, not on the theoretical reconstruction of STePS. (5.21)

We also discovered that participant materials need less revision than we expected. The sixth graders in the 1990-91 cohort are using the adult manual, A Participant's Guide to STePS. They enjoy working with adult materials and are increasing their vocabulary in the process. (3.24) Again, it appears that we underestimated the abilities of the sixth graders in Mrs. Clark's class.

The literature on educational reform emphasizes that elementary and secondary education needs to become more responsive to the demands of the work force. The STePS model provides students with a set of skills that are in high demand: the skills to work together as team problem solvers. (2.24)

On the basis of this investigation, we hypothesize that other adult models can be gainfully used by children in middle and high schools. Adapting adult training models for the schoolroom will require an investment in teacher staff development, in supplemental instructional materials development and in equipment. However these costs are not considerable. With such an investment, children can learn in school the selfsame material they are likely to encounter when they enter the workforce.

CITATIONS

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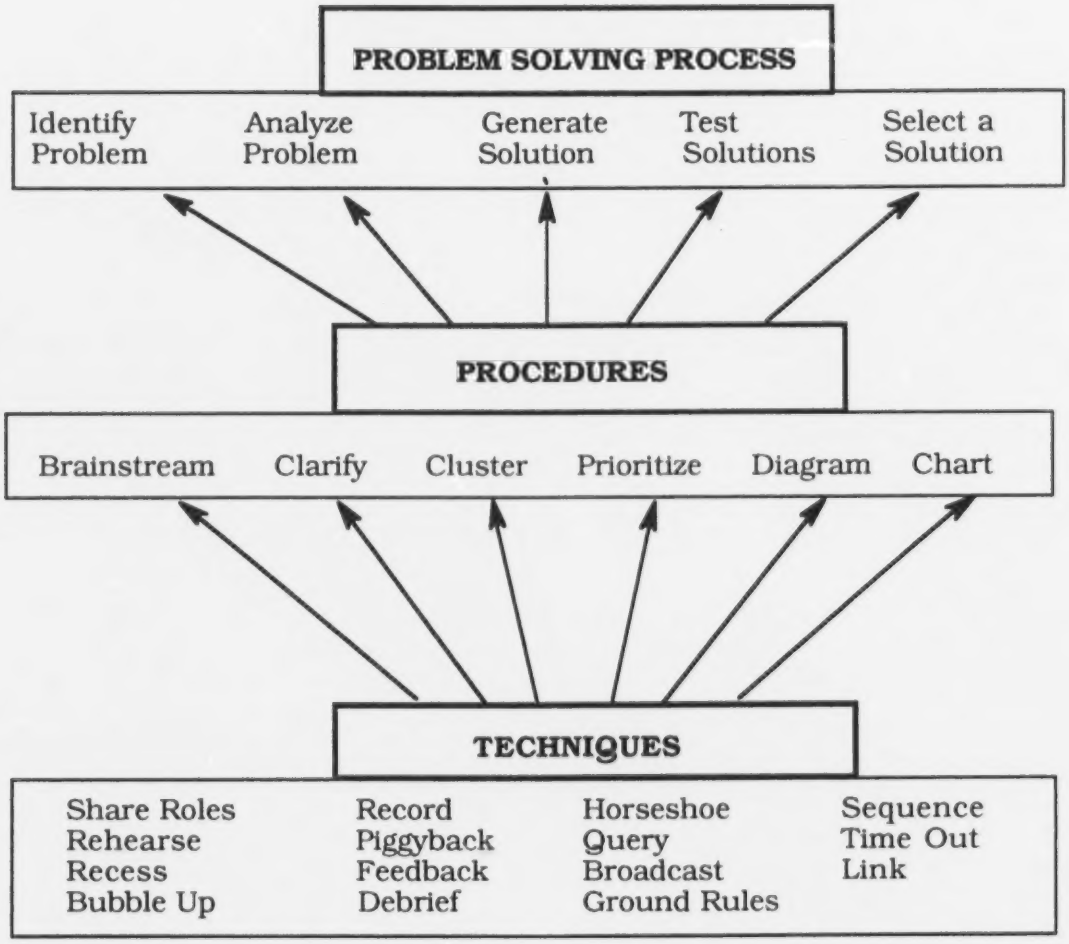
STePS
Structured Team Problem Solving



All fifteen **techniques** are used during each **procedure**.

Procedures may be used during each step of the **process**.

The use of **procedures and techniques** insure that **consensus** is built as **problems are solved**.

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Appendix B

MY STePS VOCABULARY LIST

NAME _____

accountable

adequate

adhere

ample

analyze

chronological

clarify

cluster

collaborate

colleague

collegiality

concise

consensus

constructive

designate

doable

emerge

generate

guardian

identify

initiate

insure

mandate

metacognition

monitor

nonverbal

norms

originate

paraphrase

prioritize

quantify

querry

reanalyze

restate

rehearse

sequence

technique

tone

trust

value

verbal

via

wield

WORDS THAT SHOULD BE ADDED TO THE STePS VOCABULARY LIST

Appendix C

MY STePS FEEDBACK DIARY

NAME _____

DATE	ROLE	FEEDBACK I RECEIVED

Appendix D

MY STePS LEARNING DIARY

NAME _____

DATE	ROLE	WHAT I AM GOOD AT	WHAT I NEED TO WORK ON

MY STePS TEAM LOG

NAME _____

NAMES OF TEAM MEMBERS	DATES WE WORKED	WHAT WE WORKED ON	WHAT WE ACCOMPLISHED